# Studies on Sensory Deprivation: IV. Part 1. Introductory Remarks and General Methods

# STUDIES ON SENSORY DEPRIVATION: IV.*

## PART 1. INTRODUCTORY REMARKS AND GENERAL METHODS

By

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As an introduction to the following papers, the general standpoint and the general methods were described. The study consisted of two series of the experiments, which were performed under the condition of 18 hrs. sensory deprivation to prevent the patterning of sensory stimulation using 23 male undergraduate students as Ss.

In our previous studies, we tried to attribute the various differentiating results in sensory deprivation researches to the different natures of functions in the organism, rather than to the differences of experimental conditions (1, 2, 3). The effort was based upon the view that every function of the organism should be controlled or regulated to produce normal behaviors, as Kitamura had stated in the first paper of these serial studies. Further he pointed out five kinds of such "control" or "regulation" (1).

Now then, it would be required to take account of the acts of the control or regulation, in order that one may have a proper understanding of each function of the organism. Thus in our studies, sensory deprivation was regarded as a disturbing situation of the control or regulation which operates properly in the normal environment. Under the circumstances of reduced control or regulation, what influences could be expected for each function? It should be noticed at first that the reduced control or regulation would not lead to a deterioration of every function all at once, for the function of control or regulation implies both the facilitations of some functions and the deteriorations of other functions.

The assumption was proved to be tenable through the pattern of changes observed on several functions after the sensory deprivation. Thus the hypothesis I was led; "the higher order functions would be deteriorated by sensory deprivation and the lower order functions facilitated" (1, 2, 3).

Not all the findings, however, could be satisfactorily explained in these terms of the hypothesis I. Such difficulties were suggesting two problems to be examined.

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The one is the question whether in addition to the low-high dimension of functions, there is any need for other dimensions which are rationally able to differentiate the various aspects of organism's whole functionings. With respect to the point, the distinction between the cognitive and perceptual processes of external world and the inner experience or body-oriented processes was referred and the hypothesis II was proposed (3). Another is the problem on the efficiency or adequacy of the experimental procedures. Two issues will be included in the problem, that is, (a) the validity or adequacy of the experimental procedures to control the sensory input, and (b) that of the procedures to identify the effects of sensory deprivation. In the present stage of our sensory deprivation research, it will be reasonable to begin with the examination of the latter issue of the above two.

In this study, together with the application of some new tests, it will be tried to improve the procedures to test the effects of sensory deprivation, especially the time elapsed from the release from experimental confinement will be taken into consideration as a variable, because it has been noticed that the effects of sensory deprivation upon some functions easily disappear in a relatively short time.

## Methods

*Procedure:* The experimental procedures to control the sensory input were almost the same with those of previous study and its aim was to prevent the patterning of sensory stimulation. But some modifications were made:

(1) The period of sensory deprivation was shortened to 18 hrs. from 24 hrs. in the preceding study.

(2) The beginning time of the experimental confinement was changed from at 1 p.m. to at about 8～9 p.m. and the Ss were released at about 2～3 p.m. on the next day. In the previous studies, it was observed that the Ss had a sleep during the early period of the confinement for one or two hrs., though the polygraphic records indicated the living rhythm will survive under the 48 hrs. sensory deprivation (2). Such fact seemed to show the experimental early sleep having an important significance in the experiment. Therefore, the beginning time of the sensory deprivation was reconciled with the time to sleep in an ordinary life in order to find a clue to the nature of the early sleep.

(3) In the recording of EEG, a frequency analyser was used at the same time.

(4) To make the experimental conditions strict, the experimental shielded cubicle was more completely sound-proofed; the cubicle as a whole, which was constructed in a sound-proofed room, was covered with sound-proof material and supported by shock absorber and also some testings were administered by interphone system.

The study consisted of two series of experiments: series I and series II. Series I was carried out from June to August, Series II from September to November, in 1964. They differed from each other in some kinds of tests contained in the test battery and especially in the order of their administration as to the common test. Although

not all the tests commonly included in both series, the administrating order of the testings which were supposed to be easily influenced by the time of administration, e.g., the time elapsed from the end of the experimental confinement, was nearly reversed in the two series. As in the previous studies, the tests were administered twice, before and after the experimental confinement and never given during the period. In several tests a control group was used.

The following tests were given in the named sequence. *Series I*: (1) reproduction of paired-associate learning, (2) test of immediate memory (word-span test), (3) twenty answers method, (4) recording of standard EEG, (5) TAT, (6) measurement of hearing acuity, (7) test of static sense, (8) Aktualgenese test, (9) test of the Müller Lyer Illusion, (10) test of movement after-image, (11) weight lifting experiment (size-weight illusion), (12) medical examination and physical measurement, and (13) interview.

*Series II:* (1) test of static sense (a), (2) weight lifting experiment (test of indirect suggestion through gradual increment of weight), (3) Aktualgenese test, (4) test of the Müller Lyer Illusion, (5) test of movement after-image, (6) measurement of cognition threshold of words, (7) test of static sense (b), (8) reproduction of space perception by muscular movement, (9) medical examination and physical measurement, (10) test of immediate memory (word-span test), (11) double performance test (Rybacoff's method), (12) recording of standard EEG, (13) twenty answers method, and (14) interview.

All the tests were finished within 2 hrs. in both series. The lists of test battery contain the tests unreported their results in the following papers.

*Subjects:* The Yatabe-Guilford personality inventory was administered to 40 undergraduate male students who had participated in another experiment and among them 26 students showing no extreme deviation in their profiles of personality traits were selected as Ss. They were divided into two groups with the same number which were allocated to series I and series II respectively, and were paid for their participation in the experiments. No Ss required to be released from the confinment, but 3 students in the group of series II missed their appointments, so the results of series II were obtained from remaining 10 Ss.

## References

(1) Kitamura, S. et al. Studies on sensory deprivation: I. Preliminary studies. *Tohoku Psychol. Folia*, 1963, 22, 1–39.

(2) Kitamura, S. et al. Studies on sensory deprivation: II. *Tohoku Psychol. Folia*, 1964, 22, 57–89.

(3) Kitamura, S. et al. Studies on sensory deprivation: III. *Tohoku Psychol. Folia*, 1965, 23, 53–81.

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